

REMARKS

Claims 1-9, 11-18, 21-25 remain in this application. Reconsideration in light of the amendments and remarks made herein is respectfully requested.

The present invention is directed to a method for preparing a hydrogen generation reactor chamber to reduce coking by applying a cold spray of an alkaline oxide, doped with alkali or alkaline earth metals mixed with metal (gas-fill mixture), to at least one surface within the chamber. “The term ‘cold spray’ comes from the fact that the temperature at which the spray is occurring is lower than the melting point of the material” (Specification, para. 0037). The metal is mixed with the alkaline oxide to provide ductility to the gas-fill mixture. Id.

The Office Action rejected claims 1-9, 11-18, 21-25 under 35 U.S.C. §103(a) as being obvious over *Brophy et al.* (U.S. Publ. No. 2004/0034266) in view of *Sandia* (an article) (Office Action of 03/18/2008, page 3).

Applicants respectfully traverse.

Attached is a 1.131 declaration of Applicant Anand Chellappa establishing conception and diligence toward reduction to practice of the invention(s) claimed in this application in the United States, prior to June 13, 2002, and, therefore, before the earliest claimed priority date of *Brophy et al.*. Applicant submits that *Brophy et al.* is not a prior art reference, and respectfully requests that the obviousness rejection be withdrawn.

Additionally, *Brophy et al.* fails to disclose, teach or suggest various features of the claimed invention. *Brophy et al.* is directed to catalytic oxidative dehydrogenation and microchannel reactors for catalytic oxidative dehydrogenation (title). As the Office Action of 03/18/2007 noted, *Brophy et al.* teaches that reactor walls can be coated with a passivation layer to reduce coking (para. 0077). “Suitable passivation coatings include a refractory oxide such as silica, alumina, zirconia, titania, chromia, ceria, Group II metals (alkaline earths) and rare earth metals, atomic numbers 57-71” (para. 0077).

Independent Claim 1 recites a “method for preparing a hydrogen generation reactor chamber to reduce coking, the method comprising: applying a cold spray of an alkaline oxide or oxides doped with alkali or alkaline earth metals, mixed with metal to at least one surface within the chamber.”

As recited in claim 1, the composition of the material applied is a *mixture* of (1) an *alkaline oxide(s)* *doped* with alkali or alkaline earth metals, and (2) metal.

Brophy et al. is deficient for various reasons. First, *Brophy et al.* fails to disclose, teach or suggest an alkaline oxide. Rather, *Brophy et al.* provides a list on non-alkaline oxides (para. 0077). Second, *Brophy et al.* fails to disclose, teach or suggest that the alkaline oxide is doped with alkali or alkaline earth metals. Third, *Brophy et al.* fails to disclose, teach or suggest that the composition of the material applied is a mixture. Rather, as the Office Action of 03/18/2007 noted, *Brophy et al.* provides a list of suitable passivation coatings that includes oxides and alkaline metals.

We have already demonstrated the inadequacies of teaching the present invention in *Brophy et al.* and under 35 U.S.C. § 103, it would be incumbent upon the teaching of *Sandia* to provide a teaching reference for supplementing the deficiencies of *Brophy et al.*.

Sandia discloses using cold spray to inject metal particles or other solids into a target surface (pg. 1, para. 2). While the Examiner relies on *Sandia* only for teaching cold spray, the Examiner contends that *Sandia* teaches also that oxides are among the materials injected into the supersonic jet used for cold spray (Office Action, pg 3). While the Examiner did not rely on *Sandia* for this contention, Applicant respectfully disagrees. *Sandia* teaches that the high velocity impact from cold spraying "disrupts thin metal-oxide films on the particle and substrate surfaces" (pg. 2, para. 4).

As explained in Applicant Anand Chellappa's 1.132 Declaration, attached herewith, thin metal-oxide films form on the outer surface of metal, generally by oxidizing with oxygen in the air (Chellappa Decl., ¶8). These metal-oxide films, native to the metal outer surface, obstruct bond contacts and result in poor bonding quality (Chellappa Decl., ¶9). *Sandia* does not suggest cold spraying with alkaline oxides. The only thing that *Sandia* suggests regarding such oxides is the undesirable effects of native metal oxides regarding bonding. Hence, one skilled in the art would conclude, upon reading *Sandia*, that metal oxides are not among the material *purposely* used for cold spray (Chellappa Decl., ¶11).

Since oxides were considered to have undesirable effects on bonding quality, neither *Brophy et al.* nor *Sandia* disclose, teach or suggest any expectation of success for using an oxide material in cold spray. See MPEP 2143. In contrast, the present invention, as claimed, involves purposely injecting an *alkaline oxide* material into the cold spray. *See Claim 1.* Consequently, because the combined prior art references fail to teach all of the claim limitations and fail to disclose, teach or

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suggest a reasonable expectation of success, independent claim 1 is nonobvious. Hence, Applicants respectfully requests that the rejection be withdrawn.

Dependent Claims 2-9, 11-18, 21-22

Claims 2-9, 11-18, 21-22 depend from claim 1. Thus, these claims are patentable for the same reasons advanced with respect to claim 1.

Claims 23-25

Independent claims 23-25 are patentable for the same reasons advanced above with respect to claim 1.

Applicants respectfully submit that all the claims remaining in the application are now in condition for allowance, and respectfully request that the application be passed to issue. Should any residual matters left to be resolved, the Examiner is invited to contact the undersigned agent at 714.708.6682 (office) at her convenience.

The Commissioner is hereby authorized to charge any required fee in connection with the submission of this paper, now or in the future, or credit any overpayment to Account No.: 50-2638. Please ensure that Attorney Docket Number 073358-031800 is referred to when charging any payments or credits for this case.

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Respectfully submitted,



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